Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Blue River

Waterbody Segment at a Glance:

County: Jackson
Nearby Cities: Kansas City
Length of Impairment: 24 miles
Pollutant: Chlordane
Source: Urban nonpoint sources


State map showing location of watershed

TMDL Priority Ranking: TMDL completed 2001

Description of the Problem

Beneficial uses of Blue River

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Fish Consumption by Humans
- Boating and Canoeing
- Whole Body Contact (Swimming) on one section

Use that is impaired

- Fish Consumption by Humans

Standards that apply

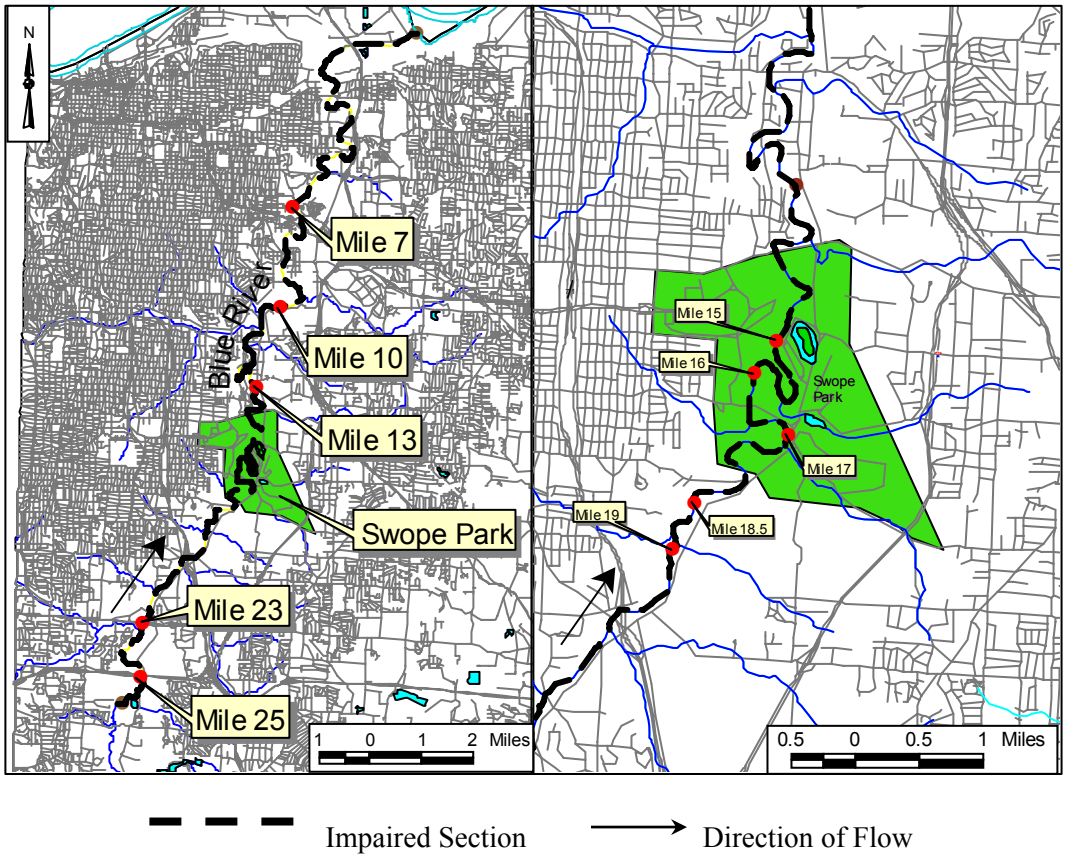
- The action level for chlordane in fish tissue, established by the U.S. Food and Drug Administration, is 0.3 milligrams per kilogram (mg/kg or parts per million). Note: 1 kilogram = 2.2 pounds

Chlordane is a pesticide that was commonly used in the past for termite control. It was also used at nurseries, on golf courses and in agriculture. Chlordane was banned for agricultural use in 1975 and all uses in 1988. But, it degrades very slowly and bio-accumulates in fish tissue, particularly in bottom-feeding/dwelling fish. This is because it is not soluble in water but binds to the soil. Human exposure to chlordane has been associated with liver cancer.

The Blue River is classified as a Metropolitan No-Discharge stream that flows through Kansas City. Since the mid-1980s, concentrations of chlordane above the current acceptable standard have been found in the tissues of fish taken from the river. The source of the contaminant is believed to be urban

runoff from dwellings where chlordane was applied for termite control and runoff from golf courses. The U.S. Environmental Protection Agency (EPA), the Missouri Department of Natural Resources and the Missouri Department of Conservation have provided data from fish tissue analysis. The first documented exceedence for chlordane in the Blue River was in 1985 and a fish consumption advisory was issued. Missouri's protocol for removing or downgrading an advisory requires at least two years of chlordane data below 0.3 mg/kg. Because this requirement has been met, the advisory was discontinued July 9, 2001. The EPA approved a Total Maximum Daily Load document for the Blue River November 19, 2001. Since chlordane has been banned, there is no specific remediation plan for this impairment. The fish consumption advisory for chlordane has been discontinued since the data confirm that chlordane has declined to below the FDA action level. Further reductions in chlordane in fish are expected to continue, but if monitoring shows a need to resume the fish consumption advisory due to chlordane contamination, the advisory will be put back into effect. Data and an area map can be found below.

Map of Impaired Portion of Blue River Showing Location of Sampling Sites



CHLORDANE IN FISH IN BLUE RIVER

Elevated levels of chlordane in fish tissue have prompted monitoring for several years. Only bottom feeders such as carp and catfish appear to routinely exceed the FDA 0.3 mg/kg guideline for chlordane. Exponential decay functions provided the best fit of declining chlordane levels in fish tissue over time.

TABLE 1. AVAILABLE DATA ON CHLORDANE IN FISH TISSUE IN BLUE RIVER, JACKSON COUNTY, MO.
(Missouri Department of Natural Resources, USEPA and Missouri Department of Conservation)

SITE NAME	YEAR	SPECIES	CHLORDANE (MG/KG)
BLUE R. MI. 16	1984	CARP	11
BLUE R. MI. 25	1985	CHANNEL CATFISH	1.572
BLUE R. MI. 25	1985	BULLHEAD CATFISH	0.718
BLUE R. MI. 25	1985	CARP	0.368
BLUE R. MI. 10	1985	CRAPPIE	0.129
BLUE R. MI. 10	1985	BULLHEAD CATFISH	0.591
BLUE R. MI. 10	1985	CARP	1.392
BLUE R. MI. 07	1985	CARP	2.5
BLUE R. MI. 17	1985	CARP	10
BLUE R. MI. 16	1985	CARP	3.5
BLUE R. MI. 10	1987	CHANNEL CATFISH	1.756
BLUE R. MI. 25	1987	LARGEMOUTH BASS	0.042
BLUE R. MI. 25	1987	CHANNEL CATFISH	0.162
BLUE R. MI. 10	1987	WHITE CRAPPIE	0.176
BLUE R. MI. 10	1987	CARP	0.909
BLUE R. MI. 25	1987	CARP	0.741
BLUE R. MI. 10	1988	CARP	5.56
BLUE R. MI. 25	1988	CARP	1.34
BLUE R. MI. 25	1989	CARP	1.91
BLUE R. MI. 25	1989	CHANNEL CATFISH	0.284
BLUE R. MI. 10	1989	CARP	6.21
BLUE R. MI. 25	1990	CARP	0.514
BLUE R. MI. 25	1990	CHANNEL CATFISH	0.13
BLUE R. MI. 16	1991	GREEN SUNFISH	0.001
BLUE R. MI. 18.5	1991	SUNFISH	0.001
BLUE R. MI. 15	1991	CATFISH	0.006
BLUE R. MI. 13	1991	GREEN SUNFISH	0.002
BLUE R. MI. 16	1991	CHANNEL CATFISH	0.006
BLUE R. MI. 25	1991	CHANNEL CATFISH	0.343

BLUE R. MI. 25	1991	CARP	1.46
BLUE R. MI. 15	1991	SUNFISH	0.001
BLUE R. MI. 16	1991	SUNFISH	0.077
BLUE R. MI. 16	1991	GREEN SUNFISH	0.077
BLUE R. MI. 18.5	1991	CATFISH	0.01
BLUE R. MI. 19	1991	GREEN SUNFISH	0.001
BLUE R. MI. 15	1992	CHANNEL CATFISH	0.14
BLUE R. MI. 15	1992	GREEN SUNFISH	0.016
BLUE R. MI. 16	1992	GREEN SUNFISH	0.014
BLUE R. MI. 18.5	1992	GREEN SUNFISH	0.01
BLUE R. MI. 18.5	1992	CHANNEL CATFISH	0.085
BLUE R. MI. 16	1993	GREEN SUNFISH	0.014
BLUE R. MI. 18.5	1993	CHANNEL CATFISH	0.049
BLUE R. MI. 18.5	1993	GREEN SUNFISH	0.003
BLUE R. MI. 15	1993	GREEN SUNFISH	0.011
BLUE R. MI. 25	1994	CARP	0.376
BLUE R. MI. 25	1994	CARP	0.515
BLUE R. MI. 25	1994	CARP	0.871
BLUE R. MI. 23	1998	CHANNEL CATFISH	0.079
BLUE R. MI. 16	1999	CARP	0.63
BLUE R. MI. 23	2000	CARP	0.33

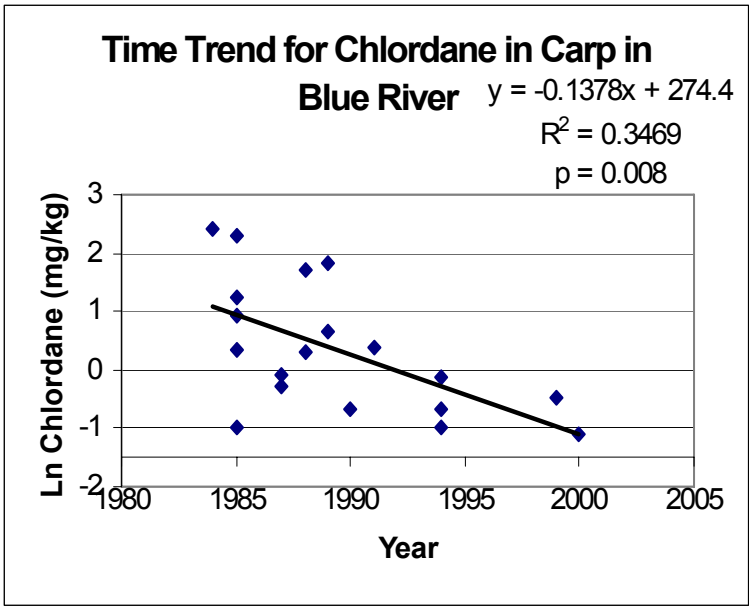
TABLE 2. AVERAGE CHLORDANE IN FISH BY SPECIES (MG/KG)

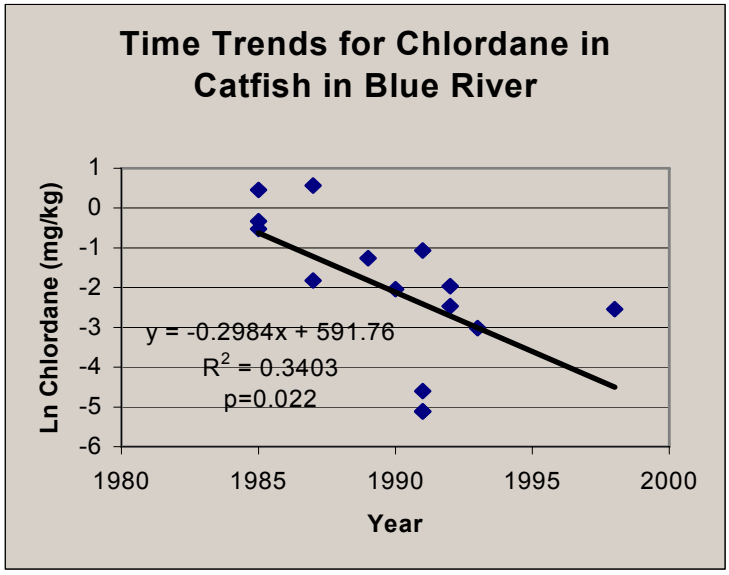
CARP	2.766
CATFISH	0.395
CRAPPIE	0.152
SUNFISH	0.018
BASS	0.042

TABLE 3. TIME TRENDS IN CHLORDANE IN CARP IN BLUE RIVER (MG/KG)			
SPECIES	**YEAR**	**CHLORDANE**	**NATURAL LOG (Ln) CHLORDANE**
CARP	1984	11	2.397895273
CARP	1985	0.368	-0.999672341
CARP	1985	1.392	0.330741562
CARP	1985	2.5	0.916290732
CARP	1985	10	2.302585093
CARP	1985	3.5	1.252762968
CARP	1987	0.741	-0.299754654
CARP	1987	0.909	-0.095410185
CARP	1988	1.34	0.292669614
CARP	1988	5.56	1.715598108
CARP	1989	1.91	0.647103242
CARP	1989	6.21	1.826160896
CARP	1990	0.514	-0.665532014
CARP	1991	1.46	0.378436436
CARP	1994	0.871	-0.138113302
CARP	1994	0.515	-0.663588378
CARP	1994	0.376	-0.978166136
CARP	1999	0.63	-0.462035460
CARP	2000	0.33	-1.108662625

TABLE 4. PREDICTED CHLORDANE IN CARP IN BLUE RIVER (MG/KG)	
YEAR	CHLORDANE
1985	2.6261004
1990	1.3191664
1995	0.6626555
2000	0.3328711
2005	0.1672108
2010	0.0839948

TABLE 5. TIME TRENDS FOR CHLORDANE IN CATFISH IN BLUE RIVER (MG/KG)			
SPECIES	**YEAR**	**CHLORDANE**	**Ln CHLORDANE**
BULLHEAD CATFISH	1985	0.591	-0.525939262
BULLHEAD CATFISH	1985	0.718	-0.331285710
CHANNEL CATFISH	1985	1.572	0.452348694
CHANNEL CATFISH	1987	0.162	-1.820158944
CHANNEL CATFISH	1987	1.756	0.563038495
CHANNEL CATFISH	1989	0.284	-1.258781041
CHANNEL CATFISH	1990	0.130	-2.040220829
CATFISH	1991	0.006	-5.115995810
CATFISH	1991	0.010	-4.605170186
CHANNEL CATFISH	1991	0.343	-1.070024832
CHANNEL CATFISH	1991	0.006	-5.115995810
CHANNEL CATFISH	1992	0.140	-1.966112856
CHANNEL CATFISH	1992	0.085	-2.465104022
CHANNEL CATFISH	1993	0.049	-3.015934981
CHANNEL CATFISH	1998	0.079	-2.538307427





Analyses were performed for carp and catfish to determine if the chlordane concentrations are decreasing with time. The result was that the data changes cannot be explained by chance alone, instead, it is apparently decreasing with time. Further monitoring will determine whether this trend continues.

For more information call or write:
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